



CHAPTER 4

STANDARDS FOR TRAIL CONSTRUCTION





The ultimate objective of trail standards is to provide for an enjoyable hiking experience. In order to achieve this objective, standards must ensure high-quality construction and maintenance, a consistent look, and a basic level of safety. They should also provide for persons with disabilities where appropriate, and protect the natural resources through which the trail meanders. The following standards were developed to meet these objectives without compromising the character of the trail, or imposing undue hardship upon those who maintain the trail.

Figure 1 on page 4-5 summarizes the desired trail standards according to the Recreation Opportunity Spectrum (see Chapter 1 to determine level of accessibility). Since the trail passes through three recreation settings (see Chapter 2), it will change accordingly. However, the trail will still be recognizable as the Ice Age NST through consistency of signage, blaze color, and clearing width. Improvements to a particular trail segment should be made if it is significantly below the standards. Trail realignment or heavy maintenance are good opportunities to reconstruct the trail up to standard.

TREAD WIDTH

Tread width is the actual walking surface of the trail—whether native soil, grass, or surfaced. Initial tread should be constructed or smoothed to this standard. In less-used areas, the bare tread may gradually transform into a tread that needs to be mowed. This is acceptable as long as the underlying, smooth structure is still in place.

CLEARING WIDTH

Clearing width is the area kept free of brush, limbs, briars, tall grass, weeds, and other obstructions which could slap against the hiker or their pack, or soak them after brushing against them following a rain or heavy dew. In heavily wooded areas, simply pruning limbs will normally maintain the clearing width. Here, the area between the edge of the tread and the edge of the clearing is normally leaf litter or short herbaceous plants. While four feet is the average standard width, some variation is allowed and encouraged where sensitivity to the aesthetics or natural resources of the surrounding area is needed. For example, in wooded areas, there are occasions when it is desirable to narrow the clearing width in order to route the trail between two large, visually interesting trees. Generally, the trail winds between existing medium to large size trees, and is created by cutting only smaller trees and saplings. Narrowing the clearing width below the desired standard is done only for aesthetic reasons—not merely to reduce trail construction/maintenance efforts. When the trail crosses fields or prairies, it is suggested that as a minimum, the entire clearing width should be mowed. Widening the mowing area may also create a variety of visually pleasing clearings. These clearings may highlight a bright clump of wild flowers or a flowering shrub such as a hawthorn or dogwood.

Figure 1 (on page 4-5) shows the clearing width on each side of the tread. On a hiking segment in a rural area, the total clearing width would be the 24-inch tread plus 12 inches on each side for a total of 48 inches (the commonly accepted 4-foot clearing window).

CLEARING HEIGHT

The trail should be cleared to a height of 8 feet (10 feet within Wisconsin DNR properties). If the trail is in an area of deep snow and it receives winter use, clearing may have to be higher.

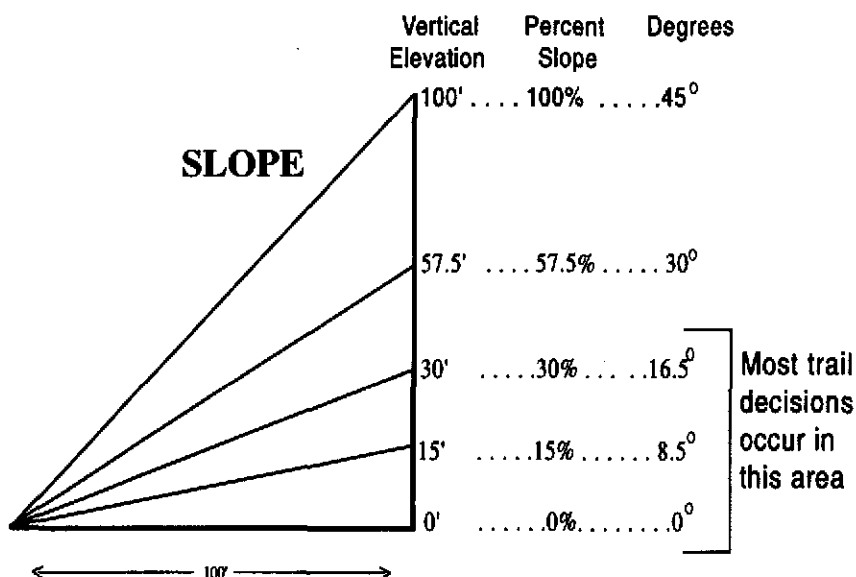


SLOPE (SUSTAINED)

The slope (grade) of the trail may be the key factor contributing to tread stability. Trail grades must be moderate to promote a stable, maintainable tread and a more pleasant hike. The trail should be designed to traverse hilly areas with gentle changes in grade. A sustained slope is a consistent grade that is greater than 100 feet in length.

To minimize erosion and increase hiker safety, the slope should normally be less than 10%—even in steep terrain. Grades less than 7% in all soils are ideal, but in sandy soils they

are almost a necessity to prevent erosion. In flatter areas, trail should be located so that there is some grade to provide for proper drainage. A grade should undulate gently to provide natural drainage and to eliminate monotonous level stretches and long, steep grades that are tiring to trail users.



Slope can be calculated in degrees, but is normally calculated in percent by dividing the vertical distance by the horizontal distance and multiplying by 100 (10 feet of rise/100 feet of horizontal distance $\times 100 = 10\%$). An easier, more accurate way to determine slope is through the use of a tool, about the size of a compass, called a clinometer. By sighting through the clinometer, the percent of slope can be read (see Chapter 10—Selecting the Right Tool).

SLOPE (MAXIMUM)

While reasonable efforts should be made to construct the trail using the sustained slope guidelines, there are situations where doing so is impossible. Because of terrain obstructions, such as cliffs, it may be necessary to use a short, steep segment to regain access to more moderate slopes. In these instances, the maximum slope guidelines should be used and additional erosion control measures incorporated. Sections of trail that exceed the sustained grade standards should be less than 100 feet.

In some areas, it may be necessary to go up a very steep slope for a short distance. In these areas, steps may be necessary but should be considered as a last resort due to the barrier they impose on many people.

CROSS SLOPE

Cross slope is a consideration when constructing trail across the face of a hill (sidehill trail). Some degree of cross slope, or out slope, is desirable so that water moving down the face of the hill continues across the trail. A cupped trail or a trail that slopes back into the hill collects water and is undesirable. However, the cross slope should not exceed the percentages shown in Figure 1. Cross



slopes greater than those shown make walking on the trail uncomfortable and serve as an impediment to mobility-impaired individuals. A 5% cross slope on a 24-inch tread constitutes a drop of 1.2 inches.

ACCESSIBLE TRAIL STANDARDS

These standards apply only when a trail segment is designed to be fully accessible. Figure 1 specifies the maximum distance between passing and rest areas. Each passing space should be 60" x 60". At intervals specified, rest areas are built adjacent to passing areas and may include a bench or other facilities. (Additional site details can be found in the appendix)

TRAIL SURFACE

In most cases, the native material found during trail construction will be satisfactory for surfacing the trail. However, if the material consists of large amounts of topsoil or organic matter, it should be set aside for later use as a cover and planting surface for exposed sub-soil.

Figure 1 shows a range of surfaces that are acceptable in the various ROS settings. While several options are shown for rural/roaded natural areas, the preference is for native surfacing. The Accessible Surface Standards apply only when a trail segment is designed to be fully accessible. *Wood chips should not be used to correct wetness problems. They only add more organic material to the site and compound the problem when they rot. Also, wood chips cannot be used on steeper slopes, as they do not stay in place. They are acceptable on relatively level sections of trail to smooth an otherwise rough tread surface and to help retard weed infestation and wear of the natural surface.*



Figure 1: Ice Age Trail Construction Design Standards

Standards (desired)	ROS CLASS		
	Urban	Rural & Roaded Natural	Semiprimitive
<u>Tread Width</u> Hiking Segments Accessible Segments	48" 60"	24" 36"	18" 28"
<u>Clearing Width</u> (each side of tread)	24"	12" (WIDNR-24")	12"
<u>Clearing Height</u> (minimum)	10'	8' (WIDNR-10')	8'
<u>Slope (max. sustained)</u> Hiking Segments Accessible Segments	10% 5%	10% 5%	15% 12%
<u>Slope (max.)</u> Hiking Segments Accessible Segments	15% for 100' 8% for 100'	20% for 100' 10% for 50'	30% for 100' 10% for 50'
<u>Cross Slope (max.)</u>	3%	5%	8%
<u>Accessible Segment Standards</u> Passing Spot Int.-max. Rest Area Interval-max.	N/A 1,200'	600' 1,200'	1,200' 1/2 mile
<u>Surfaces</u> <u>Accessible Surfaces</u>	Asphalt, concrete, stabilized aggregate, screening ⁽¹⁾ , wood chip, sod. Asphalt, concrete, stabilized aggregate.	Native, wood chip ⁽²⁾ , stabilized aggregate, screening ⁽¹⁾ Asphalt, stabilized aggregate.	Native Native, stabilized aggregate

(1) Limestone screenings include the fines.

(2) Not in wet areas--adds to problem.